IN THE CLAIMS

Please cancel Claims 1-11, and add new Claims 12-24:

-- 12. Nickel mixed hydroxide with Ni as the main element and with a layer structure, comprising

a) at least one element M_a from the group comprising Fe, Cr, Co, Ti, Zr and Cu which is present in two different oxidation states which differ by one electron in terms of the number of outer electrons;

b) at least one element M_b from the group comprising B, Al, Ga, In and rare earth metals present in the trivalent oxidation state;

c) optionally at least one element M_c from the group comprising Mg, Ca, Sr, Ba and Zn present in the divalent oxidation state;

d) apart from the hydroxide, at least one additional anion selected from the group consisting of halides, carbonate, sulfate, acetate, oxalate, borate and phosphate in a quantity sufficient to preserve the electroneutrality of the mixed hydroxide; and

e) water of hydration in a quantity which stabilizes the relevant structure of the mixed hydroxide.

13. The nickel mixed hydroxide according to Claim 12, wherein the proportion of Ni is from 60 to 92 mol % and the total proportion of the elements M_a, M_b and M_c is from 40 to 8 mol %, in each case based on the total amount of Ni, M_a, M_b and M_c.

14. The nickel mixed hydroxide according to Claim 12, wherein the proportion of the element M_a is from 10 to 40 mol %, based on the total amount of the elements M_a, M_b and M_c.

15. The nickel mixed hydroxide according to Claim 12, wherein the proportion of the element M_c is from 1 to 30 mol %, based on the total amount of elements M_a, M_b and M_c.

16. The nickel mixed hydroxide according to Claim 12, wherein the degree of oxidation α of the element M_a, defined according to the following formula (I), is from 0.01 to 0.99

$$\alpha = \frac{M_a^{+(x+1)}}{M_a^{+(x+1)} + M_a^{+x}} \qquad (I),$$

wherein $M_a^{+(x+1)}$ means the molar quantity of the element M_a in the higher oxidation state, and $M_a^{+(x)}$ the molar quantity of the element M_a in the lower oxidation state, and x is a number between 1 and 3.

17. The nickel mixed hydroxide according to Claim 12, wherein the nickel mixed hydroxide is in the form of a powder with an average particle size from 1 to 100 μm.

18. The nickel mixed hydroxide according to Claim 12, wherein the rare earth metals of the element M_b are selected from the group consisting of SC, Y and La.

19. The nickel mixed hydroxide according to Claim 12, wherein the halides are selected from the group consisting of fluoride and chloride.

20. The nickel mixed hydroxide according to Claim 12, wherein the nickel mixed hydroxide is a cathode material in an alkaline battery.

21. A process for preparing a nickel mixed hydroxide with Ni as the main element and with a layer structure, comprising:

a) at least one element M_a selected from the group consisting of Fe, Cr, Co, Ti, Zr and Cu which is present in two different oxidation states which differ by one electron in terms of the number of outer electrons;

b) at least one element M_b from selected from the group consisting of B, Al, Ga, In and rare earth metals present in the trivalent oxidation state;

c) optionally at least one element M_c selected from the group consisting of Mg, Ca, Sr, Ba and Zn present in the divalent oxidation state;

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d) apart from the hydroxide, at least one additional anion selected from the group consisting of halides, carbonate, sulfate, acetate, oxalate, borate and phosphate in a quantity sufficient to preserve the electroneutrality of the mixed hydroxide; and

e) water of hydration in a quantity which stabilizes the relevant structure of the mixed hydroxide,

the process comprising reacting components required to obtain the relevant mixed hydroxides in the form of water-soluble salts of Ni and of the elements M_a, M_b and optionally M_c in a basic, aqueous medium for the co-precipitation of hydroxide reaction products with the formation of a homogeneous suspension of said reaction products,

wherein either water-soluble salts of the element M_a are used in different oxidation states or a water-soluble salt of the element M_a is used in the lower oxidation state and a partial oxidation is carried out until the desired ratio is obtained between the different oxidation states of the element M_a, or a water-soluble salt of the element M_a is used in the higher oxidation state and a partial reduction is carried out until the desired ratio is obtained between the different oxidation states of the element M_a, separation of the water from the suspension, and drying of the reaction products.

22. The process according to Claim 21, wherein at least one of the reaction components is introduced into the aqueous medium by anodic oxidation of the corresponding metal.

23. The process according to Claim 21, wherein the reaction is carried out at a pH from 8 to 13.

24. The process according to Claim 21, wherein partial oxidation is carried out by using oxygen, H_2O_2, hypochlorite, peroxodisulfates or percarbonates as oxidizing agent. --